# Pediatric Special Health Care Needs: Central Lines

## I. All Provider Levels

1. Follow the General Patient Care guidelines in section A1.

2. Establish patient responsiveness. If cervical spine trauma is suspected, manually stabilize the spine.

3. Open the airway using a head tilt chin lift if no spinal trauma is suspected, or modified jaw thrust if spinal trauma is suspected.

    A. Consider placing an oropharyngeal or nasopharyngeal airway adjunct if the airway cannot be maintained with positioning.

    B. Suction as necessary.

    C. If the child has a tracheostomy tube, follow the tracheostomy protocol in section V1 to manage the tracheostomy tube.

4. Assess the patient's breathing including rate, inspection, and auscultation.

    A. Assess effort and adequacy of ventilation as indicated by chest rise.

    B. Obtain a pulse oximeter reading.

5. If breathing is adequate, place the child in a position of comfort and administer 100% oxygen

6. If no breathing is present, then position the airway and start bag mask ventilation using 100% oxygen.

    A. If the child has a tracheostomy tube, follow the tracheostomy protocol in section V1 to manage the tracheostomy tube.

## I. All Provider Levels (continued)

7. If airway cannot be maintained, begin ventilations with B-V-M and initiate advanced airway management using a combi-tube.

> ***Note Well:*** *Do not use a combi-tube on a patient younger than 16 years of age or less than 5-feet tall.*

> ***Note Well:*** *The EMT-I and EMT-P should use ET intubation.*

8. Check pulse.

   A. If no pulse is present, begin chest compressions and follow the appropriate algorithm.

   B. Follow the steps below to manage the central line.

9. Assess circulation and perfusion.

10. Ask the caregivers for the child's baseline vital signs.

11. Determine if the cause of the emergency is related to the central line by examining the central line and its site of placement.

    A. Determine whether it is an implanted catheter, peripherally inserted central venous catheter (PICC) or tunneled central venous catheter.

12. If the central venous line is partially or completely dislodged, or damaged, or if there is bleeding from the site, apply direct pressure to the skin site, stop any infusions, and clamp the catheter.

## I. All Provider Levels (continued)

13. Estimate blood loss and assess for signs and symptoms of an air embolism (tachypnea, chest pain, shortness of breath, or loss of consciousness) or blood clots.

    A. If an air embolism is suspected, clamp the central line with the clamp on the tube itself, place the child on the left side in a head down position, and administer high flow oxygen.

14. If there are fluids infusing through the central line, determine the nature of the fluids and the time that the fluids were started.

15. Obtain a complete medical history for the patient, including a history of the present illness and the past medical history.

17. Call for ALS support.

    A. Initiate care and do not delay transport waiting for an ALS unit.

18. If there are fluids infusing through the central line and ALS transport is not available, ask the primary care providers to stop the infusion, clamp and heparinize the central line before transport.

> ***Note Well:*** *There are some infusions that may be detrimental to stop. Ask the caregiver if it is all right to stop or change the infusion first. Contact Medical Control for additional instructions*

## II. Advanced Life Support Providers

1. Initiate cardiac monitoring.

   A. Treat any arrhythmias with the appropriate algorithm.

2. If the child has a fever or if the central line is damaged, stop fluid infusion immediately.

   A. If the child does not have a fever, contact medical control to determine whether fluid infusion should be stopped or changed to normal saline.

> ***Note Well:*** *There are some infusions that may be detrimental to stop. Ask the caregiver if it is all right to stop or change the infusion first. Contact Medical Control for additional instructions*

3. If the child is in cardiac arrest, the central line is not damaged, and the catheter is not an implanted catheter, utilize the central line to infuse fluids and medications.

   A. Access the central line using the guidelines as outlined in Section II, Step 5.

> ***Note Well:*** *An implanted central venous line cannot be used unless it has been accessed prior to EMS arrival or the care givers have additional equipment to access the line.*

## II. Advanced Life Support Providers (continued)

4. If the child is not in cardiac arrest, or the central venous line is damaged, obtain IV access.

> ***Note Well:*** *BLS Providers cannot start an IV on a patient less than eight years of age*

> ***Note Well:*** *An ALS unit must be en route or on scene.*

> ***Note Well:*** *If IV access cannot be readily established and the child is younger than 6 years of age then ALS Providers only may proceed with IO access. If the child is over 6 years of age, then contact Medical Control for IO access.*

> ***Note Well:*** *If the central line is damaged, or it is an implanted catheter that has not been previously accessed, it cannot be used. If you do not have the equipment to access the central line, ask the caregivers for supplies.*

5. With permission from medical control, access the central line

> ***Note Well:*** ***Do Not Use The Catheter If It Is Damaged.***

## II. Advanced Life Support Providers (continued)

A. For a central venous catheter:

i. Wash hands and wear sterile gloves

ii. Scrub the injection cap with alcohol. Do not use Providine-iodine.

iii. Clamp the catheter 3 inches from the cap prior to removing the injection cap.

iv. Remove the cap and secure a 10 cc or 12 cc syringe filled with 5 cc of normal saline onto the injection port site of the central line.

> ***Note Well:*** *Always hold the connecting syringe with the plunger straight up to avoid an accidental injection of air.*

v. Unclamp the catheter and attempt to slowly aspirate 5 cc of blood

a. If blood clots are aspirated: immediately clamp the catheter, contact medical control and do not proceed further.

b. Clamp the catheter and discard aspirate.

vi. Secure a new syringe filled with 10 cc of normal saline, unclamp and slowly infuse 5 to 7 cc into the catheter to ensure patency.

a. If resistance is met, immediately stop procedure and clamp catheter.

vii. Clamp the catheter and remove the syringe.

viii. Place a well-primed IV line onto the injection port and secure with tape.

ix. Unclamp the line and catheter.

x. Administer fluids and medications as necessary.

## II. Advanced Life Support Providers (continued)

B. For a Peripherally Inserted Central Venous Catheter (PICC)

i. Access using the same procedure as that of a central venous line (see A above). Observe the following precautions:

a. Do not place a tourniquet on the same arm as the PICC.

b. Do not clamp the PICC tubing. Instead, clamp the extension tubing.

c. Do not flush or aspirate from a PICC with less than a 10 cc syringe (smaller size syringes generate too much pressure and can damage the catheter.)

d. The maximum flow rates for a PICC line is 125 ml/hour for less than 2.0 sized Fr. catheters and 250 ml/hour for catheters over 2.0 sized Fr. Catheters.

***Note Well:*** *Do not take blood pressure in the same arm as PICC line.*

6. If signs and symptoms of shock exist, infuse a fluid bolus of 20cc/kg of normal saline.

A. This bolus may be repeated up to two times.

B. If signs and symptoms of shock do not exist, infuse normal saline at a KVO rate.

## III. Transport Decision

1. Initiate transport to the nearest appropriate facility as soon as possible.

2. Bring any of the child's medical charts or medical forms that the caregiver may have, as well as any supplies that the caregiver may have for the central line.

> ***Note Well:*** *Some caregivers carry a "go bag" for their children with extra supplies. Ask the parent if they have a "go bag" or similar bag for their child and bring it to the hospital.*

3. Perform focused history and detailed physical exam en route to the hospital.

4. Reassess at least every 3-5 minutes, more frequently as necessary and possible.

## IV. The Following Options are Available by Medical Control Only

1. Stopping the administration of fluids through a central line prior to transport.

2. Accessing central lines for medication administration when IV/IO access is not obtainable.


***This protocol was developed and revised by Children's National Medical Center, Center for Prehospital Pediatrics, Division of Emergency Medicine and Trauma Services, Washington, D.C.***